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A proposed framework to operationalize ESS for the mitigation of soil threats

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Despite various research activities in the last decades across the world, many challenges remain to integrate the concept of ecosystem services (ESS) in decision-making, and a coherent approach to assess and value ESS is still lacking. There are a lot of different – often context-specific – ESS frameworks with their own definitions and understanding of terms. Based on a thorough review, the EU FP7 project RECARE (www.recare-project.eu) suggests an adapted framework for ecosystem services related to soils that can be used for practical application in preventing and remediating degradation of soils in Europe. This lays the foundation for the development and selection of appropriate methods to measure, evaluate, communicate and negotiate the services we obtain from soils with stakeholders in order to improve land management.

Similar to many ESS frameworks, the RECARE framework distinguishes between an ecosystem and human well-being part. As the RECARE project is focused on soil threats, this is the starting point on the ecosystem part of the framework. Soil threats affect natural capital, such as soil, water, vegetation, air and animals, and are in turn influenced by those. Within the natural capital, the RECARE framework focuses especially on soil and its properties, classified in inherent and manageable properties. The natural capital then enables and underpins soil processes, while at the same time being affected by those. Soil processes, finally, are the ecosystem's capacity to provide services, thus they support the provision of soil functions and ESS. ESS may be utilized to produce benefits for individuals and human society. Those benefits are explicitly or implicitly valued by individuals and human society. The values placed on those benefits influence policy and decision-making and thus lead to a societal response. Individual (e.g. farmers') and societal decision making and policy determine land management and other (human) driving forces, which in turn affect soil threats and natural capital.

In order to improve ESS with Sustainable Land Management (SLM) – i.e. measures aimed to prevent or remediate soil threats, the services identified in the framework need to be "manageable" (modifiable) for the stakeholders. To this end, effects of soil threats and prevention / remediation measures are captured by key soil properties as well as through bio-physical (e.g. reduced soil loss), socio-economic (e.g. reduced workload) and socio-cultural (e.g. aesthetics) impact indicators. In order to use such indicators in RECARE, it should be possible to associate the changes in soil processes to impacts of prevention / remediation measures (SLM). This requires the indicators to be sensitive enough to small changes, but still sufficiently robust to provide evidence of the change and attribute it to SLM.

The RECARE ESS framework will be presented and discussed in order to further develop its operationalization. Inputs from the conference participants are highly welcome.